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AUTHOR Heimlich, Joe E.
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ABSTRACT

This digest details how global concepts of environmental education, the basic principles of ecology, and the importance of environmental responsibility can be made concrete for children at home and at school. Topics discussed are: basic principles of ecology, "What is the home?"--teaching environment through the home, and living and the quality of life--consumerism. Some important issues of environmental concern which are discussed in detail are: energy, water, air, household chemicals, and nature and humans. The digest includes a list of 11 environmental education resources for families. (Contains 11 references.) (MKR)

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Joe E. Heimlich

The world of a child is the tangible, real world of the here and now. It is difficult for children to extend ideas from the small, familiar world in which they operate to the larger, abstract world beyond. Even adults envision distant parts of the world based on their own experiences and prior learning. Nevertheless, the global concepts of environmental education, the basic principles of ecology, and the importance of environmental responsibility can be instilled in a child without reference to faraway places. These ideas can all be made concrete right where the child lives and goes to school.

Basic Principles of Ecology

One of the fundamental tenets of ecology is that all activities have by-products. In environmental education, it is understood that this tenet applies to all activities of nature, both natural and human-induced. Some of these by-products are called "pollution." Though pollution tends to have a negative connotation, not all pollution necessarily affects the environment adversely (Botkin and Keller, 1982).

Ivan Illich, an environmental philosopher, suggests that most of the problems of humans and the environment are a consequence of a society originally designed to protect people from the environment, improve their material circumstances, and enhance their freedom (Gardels and Snell, 1990). Yet, to be good for humans, the environment must be compatible with the unchangeable needs of human nature. Because people are relatively unable to adjust biologically to nature, we must change our immediate environment instead (Dubos, 1971).

Another tenet of ecology is that, as a part of nature, humans share with other animals the basic requirements of food, water, air, and habitat (Odum, 1959). The survival of humans as a species requires a habitat that will support human life, and life itself is a delicate tension between consumption and conservation (Rolston, 1986).

Although the relationship people have with nature has changed over time, it is the technological advances in human living, and not the choices by which we live, that have had the most significant impact on the environment (Guthrie, 1972). Because we spend a major portion of our time at home, it is instructive to examine the "home environment" and discover how the human activity of protecting ourselves from the environment, improving our quality of life, and providing

increasing freedom contribute to larger environmental concerns.

What is the "Home"?

The word *ecology* is derived from two Greek words: *oikos*, meaning house, and *logos*, meaning thought or study. So, ecology means the study of the home. Often we refer to an extended home such as a habitat, ecosystem, or the biosphere, but for this discussion, *home* will literally be the house, apartment, or whatever the residence of a person might be.

Our homes are part of what we call the "constructed" or built environment. Technology has enabled us to build homes that are tightly sealed to be energy efficient. Increasingly our homes are constructed of synthetic materials; air is heated, cooled, and mechanically circulated; and lighting is often not natural. Modern homes often retain internally what might otherwise flow into nature and be dissipated. There are materials and substances under, in, or used in the home that are potentially hazardous (Howe, 1988). The risks to human health from pollutants in the home are often difficult to assess, and scientists are concerned that more research is needed both on exposure to pollutants indoors and on the toxicity of those pollutants (The Conservation Foundation, 1987).

Because we do so much of our living at home, we can explore issues of how we consume, what we use, and how we dispose of what remains through looking at the home. Everything needed for exploring the global environment is present in the home. All we need to do is explore the home environment and then transfer what we learn to the rest of nature. What are the requirements for shelter that humans share with other animals? How is the habitat for a fish different from the habitat for a human? How are they the same? Do birds create waste? What do they do with it? Why can't humans do the same? Questions like these can link ideas learned at home to the larger world.

Teaching Environment Through the Home

We can use the home to teach not only about human needs, but also about how humans depend upon the rest of nature for survival. One way to structure our home discovery is to look at issues that are of environmental concern globally. Some of the most important of these issues are outlined below.

Energy. Concerns surrounding energy and the

home environment include issues of fossil fuel use, alternative energy sources—such as nuclear, solar, and wind sources—electromagnetic fields (EMFs), and energy conservation. Our world is dependent upon energy from the sun to survive; our modern lives are dependent upon energy in many forms to provide the standard of living we have come to enjoy in terms of appliances, resources, entertainment, travel, and work.

Some ways in which adults can help children appreciate the importance of energy in our lives are to identify where energy is used in the home, trace the path of energy from the natural resource to the home, explore alternative sources of energy, try some energy reduction activities, and look for sources of energy loss in the home. What about an evening in which no electricity, battery, or fuel powered energy source is used? A scavenger hunt for uses of energy in various forms is a great way to begin to look at energy and our dependence upon it. There are also kits on electricity and energy available commercially and from local power companies. These could provide a solid scientific foundation as you and your children explore the larger issues of energy generation and consumption.

Water. In the home, as well as in the community, the primary concerns related to water are those of water quality and water management. Further issues in home water use include the question of natural water management systems versus human construction (water runoff, water shed), and xeriscaping, which is the use of plants that are low maintenance when it comes to water.

Some activities that can be done with children at home or in the school include measuring water use in the bathroom and kitchen; comparing tastes of different waters; constructing erosion experiments using various plants and bare soil outdoors or potted plants and pans indoors; and discovering the properties of water such as solubility, rate of evaporation, and solid/liquid transformation. An interesting approach to investigating human/nature interactions is to explore what happens to precipitation around the home and contrasting that with what would happen to the same precipitation if there were no buildings, streets, driveways, or parking areas.

Air. Radon and other gases that migrate into homes are of major concern in some parts of the United States. Indoor air pollution, including tobacco smoke and perfumes, as well as the indoor air

pollution created by dust mites, skin, hair, and other natural causes, is of increasing interest to environmentalists and health officials. Some other sources of air pollution in the child's world include carbon or sulfur emissions and other contributors to acid rain that result from the burning of fuels to heat or cool the house and to run engines; greenhouse gases; and global climatic change.

There are items easily available in the home or at school to help a child discover the importance and role of air in the environment. Placing a plastic bag over the leaves of a weed could show how plants require air as much as animals, including humans. Using inflatable toys or balloons, games can be played to measure lung capacity. Burning candles in jars with and without lids illustrates the need for oxygen to keep a fire burning.

Household chemicals. Central to the concern about household chemicals is the chemophobia in our society. Though we rely heavily upon chemicals to make our lives easier, too often we do not understand how they work and are ignorant of the impact and possible interactions of various compounds. Other concerns include proper use versus abuse and proper disposal versus disposal that threatens the environment. Again, a great way to begin to explore household chemicals is to conduct a home survey or scavenger hunt. Did the survey include medicines? Automotive products? Art supplies? Personal grooming products?

An excellent activity for parents and children is to compare the effectiveness of homemade cleaning products with those commercially made. (The results may surprise you!) Other activities include exploring traits that make an item hazardous (toxic, reactive, corrosive, and/or ignitable) through non-hazardous experiments, such as salting lettuce leaves to see how cells die through toxicity; mixing vinegar and baking soda to see a "reaction"; placing nails in a cola beverage can to illustrate corrosivity; and relighting a candle without touching the wick with the burning match to demonstrate ignitability.

Nature and humans. The home is also a wonderful place in which to nurture a growing awareness of our dependence upon and relationship to nature. Try to find something in the home or the classroom that does not rely upon nature to provide the original resource for creating the material. How long is the list?

An excellent start on understanding this relationship comes from creating categories of natural and human-constructed items in the home. Older children may also be able to subdivide the human-constructed list according to the primary natural resource used in the product. Houseplants, pets, or even insects inside the home provide a wealth of opportunity to study, observe, and hypothesize about nature and then compare observations with human behavior. Ironically, the constructed environment is constructed using nature to protect humans from nature! What a wealth of discoveries about the global environment are literally inside our front doors.

Living and the Quality of Life—Consumerism

No discussion of ecologically responsible living would be complete without a note on consumerism and individual responsibility. Most environmental problems arise from the deepest constructs of western life—physical accoutrements, societal mores, cultural traditions, and personal habits. Understanding and responding to environmental problems require an individual to subscribe to a theory, or a set of well considered beliefs and values, about the natural world and then to practice healthful behaviors related to society, self, and the environment (Hooker, 1983).

Many advocates for environmental change suggest that it is the consumerist pattern of our society that is leading us into trouble. We often consume products for the sake of consumption, rather than considering carefully what we buy, how it is packaged, and why we buy it. One way of initiating individual change in consumption is to rediscover that what people buy is often not what they actually want—what they want is what results from having what they purchase (Durning, 1993). For example, most people buy cars in order to get places easily or for the status gained from the type of vehicle owned, not for the sake of owning the car itself. People buy cleaning products for their homes in order to make cleaning the home easier, not to own three more containers of chemicals. If we reconsider why we consume, we can often discover alternatives that may be more "environmentally friendly." Further, the more operationally literate each of us becomes in terms of understanding environmental issues, the stronger becomes our sense of personal investment in and responsibility for both prevention and remediation of our local environments (Roth, 1992), starting first in the home or school—where our future citizens live, work, and play.

Environmental Education Resources for Families

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Robison, H. (1986). *Philosophy gone wild: Essays in environmental ethics.* Buffalo, NY: Prometheus Books.

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Joe E. Heinlich is an Assistant Professor of environmental education in the School of Natural Resources at The Ohio State University. He is also an Environmental Education Associate for ERIC/CSMEE.

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